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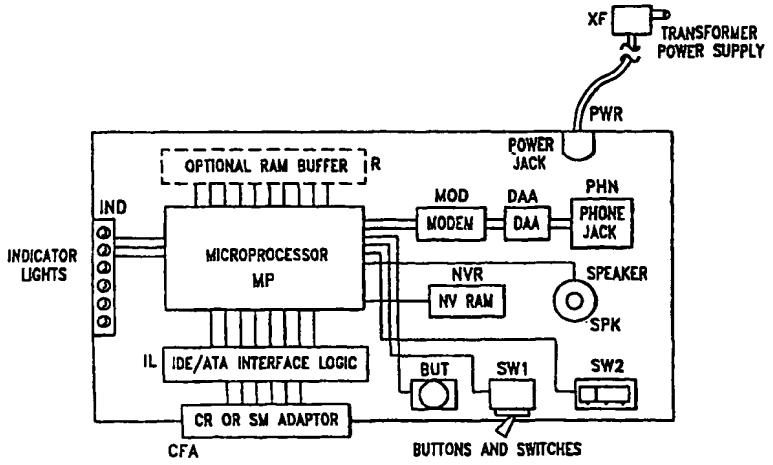

(57) Abstract

A novel technique and apparatus for enabling a photographer to transmit digital camera images to remote photographic printing and delivery locations by transmitting to a remote computerized photo–finishing station, over the telephone, or otherwise, digital images stored in a digital camera flash memory card and removed therefrom and inserted into a novel microprocessor–controlled appliance adapted to received such card after removal from the camera, enabling the remote station to process and photographically automatically print the images, and deliver them to pre–selected destinations for the photograph.

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ELECTRONIC OR DIGITAL IMAGING

FIELD OF THE INVENTION

The present invention relates generally to the field of electronic or digital imaging, being more specifically concerned with the transmission of digital images from the memory of digital cameras directly to remote locations for printing and delivery without the use of or need for a computer at the location of the digital camera.

BACKGROUND OF THE INVENTION

In the last several years, interest in digital imaging and sales of digital photography equipment has grown dramatically. Traditional camera sales however still far outpace sales of digital cameras. Part of the difficulty in moving from chemical silver-based to electronic photography is the complexity of the tools. Traditional photography is simple. The consumer loads the film, points the camera and presses the shutter button. After a roll is finished, the camera is unloaded and the film can be developed and printed within a few hours or a few days, either at a local photofinisher or through the mail.

Even though this is simple, there are many problems associated with traditional photo finishing. For instance, the consumer in general must develop and print every picture on the roll. If the consumer chooses to pay for double prints, or two prints per

picture, then every frame of the negative is printed twice. In other words, a 24 picture roll of film produces 48 prints. Many of the pictures on a roll, moreover, are defective or of low quality and could be thrown away -- even pictures inadvertently taken with the lens cap on. Some photographers inadvertently photograph a finger when shooting a picture, or the subjects of the snapshot blink when the shutter button is pressed. Printing such pictures, and especially printing multiple copies of such pictures, is wasteful; but there is no easy way to indicate which pictures are wanted before they are printed. This adds expense to the consumer in the form of charges for unnecessary prints.

According to the Photo Marketing Association, in 1997, amateur photographers consumed between 7 and 9 rolls of film per household per year. An average roll has about 24 frames indicating that each family takes around 200 pictures per year. Almost everyone turns those pictures into prints that can then be framed, put in photo albums, or mailed to friends and family.

Digital cameras and digital photography offer some benefits over such film-based photography systems. Most digital cameras are provided with an LCD display on the back that allows the photographer to look at the picture immediately after it is electronically captured. When a digital picture is taken that does not meet expectations, the picture can be deleted immediately, thereby eliminating the chance that the picture will ever be printed and freeing up memory in the camera for good or desired pictures.

Unfortunately, however, digital camera use is restricted to those who own or have access to a personal computer. Whether deploying images on the Internet or World Wide Web, or printing them using a color printer, in general, the images must be moved from the camera to a PC before they can be put in their final format. Digital photography thus

requires expertise in several areas, including the ability to install and operate image management and manipulation software. The digital camera, moreover, must be connected to the PC using a cable that gets added to the jungle of cables already attached to the back of a PC.

One of the further barriers to the growth of digital photography is the amount of time and effort required to get prints from digital images. Printing from the home computer is time-consuming and the quality of home prints is not nearly so good as photographic prints from film negatives. There are, however, several companies that offer color printers for home printing, including Canon Computer Systems, Inc., which offers the Canon BubbleJet BJC-7004 Photo; Epson America, Inc., making the Epson Stylus Color 440; and the Hewlett-Packard Company, selling the HP DeskJet 420C.

Home printing of images, though, is neither cheap nor easy. Home printers cost between $100 and $6,000 US. On the low end of the price range, while color inkjet printing quality has improved substantially, such printing still has problems, including color fading, water soluble ink that runs when prints get wet, and low resolution. Most home printers, furthermore, are incapable of "full-bleed" prints where there are no white borders left around the print. A consumer printing photos at home, accordingly, often must spend time trimming the white borders before putting the prints in a photo album. Such home printing, additionally, is expensive, with materials costing between US$0.45 and $US1.00 per print. A typical printer with a 3 year life expectancy might print 1000 images, which brings the actual equipment cost to somewhere between $0.15 and $2 per print.

Home printing, furthermore, is also time-consuming. Even if consumers don't mind the expense and the inconvenience of sizing and trimming prints to fit in a photo album, the fact that some higher quality printers take between 10 and 20 minutes to print a single page is not conducive to doing more with digital images. Printing 24 images can take several hours as opposed to putting a roll of film in a mailer, which only takes a few minutes. In fact, the only real advantage to home printing is the immediacy of the result.

Another avenue for obtaining prints from digital image files resides in the use of printing service bureaus and mail-order photofinishers. Print service bureaus charge US$7-$10 to print individual images. Corporate employees in need of high quality 8.5x11 prints for presentations or reports often use these bureaus. Because of the high cost per print, however, it is rare for a consumer to order prints from a service bureau.

Software systems have been developed for sending digital images from the PC over the Internet to several different nationwide mail-order photofinishers, including the software of FotoWire, of Palo Alto, California. Two currently participating photofinishers in the US include Mystic Color Labs of Mystic, Connecticut, and Signature Color based in Austin, Texas. Both of these labs, upon receiving images over the Internet, will print the images in the size and format requested, including 4 x 6 inches and 5 x 7 inches. Both of these labs offer other products, including photo calendars, mouse pads, and photo mugs.

The quality of the prints produced by this procedure varies greatly, moreover, even when based on images captured with high-quality digital cameras. Prints from the photofinishers exhibit problems like inaccurate color reproduction and poor focus or fuzziness. The very expensive printers used by the mail-order houses such as those

offered by Sienna Imaging, Inc. based in Englewood, Colorado, do offer a quality of prints indistinguishable from traditional silver-based photographs when used correctly. There are, however, many variables when printing digital images, and if the process is not carefully controlled, the print quality suffers. Since the photofinishers have no information about the source of the data, they are not able to do the proper color and tone transformations before printing.

The remaining option for obtaining prints from digital images is to use one of the PhotoNet-based services. A company called PictureVision of Herndon, Virginia, for example, offers a web-based service called PhotoNet Online, wherein, after film has been developed and the pictures printed, images are scanned from a customer's negatives and placed in an electronic photo album on an Internet web server operated by the company. The images can also be compressed and stored on a floppy disk that is returned to photographers when they pick up their prints. Eastman Kodak Co. of Rochester, New York, is the parent company of PictureVision. Both Kodak and Sony Electronics, Inc. of Park Ridge, New Jersey, use the PhotoNet service to offer digital image services from images originally captured on film. PictureVision, through various software programs, also offers the ability to make prints from images transmitted over the Internet. Sony's ImageStation web site (http://imagestation.sony.com/), for example, allows anyone with a digital image on a computer on the Internet, the capability to transmit that image to the ImageStation web server and order prints.

The primary stumbling block of the Internet-based methods of printing, including both the before-mentioned FotoWire and PhotoNet services, is their reliance on the PC. Many consumers, however, do not have PC's. If they do, moreover, in order to obtain

prints, it is necessary to transfer the images from the digital camera to the PC. This transfer can take anywhere from 10 minutes to 45 minutes, depending on the number and resolution of the images and on the method of connecting to the PC. The serial port might require 30 minutes of download time for 24 good quality pictures. Using a USB port or a digital camera memory card reader, like the ImageMate produced by SanDisk of Sunnyvale, California, can reduce the time to a few minutes. But once on the PC, the images must be named appropriately or stored in some directory with a recognizable name, and then, the photographer must spend somewhere between 15 minutes and 2 hours, again depending on the number and quality of the images, to upload those images to either a FotoWire service, a PhotoNet or similar system.

Of course, once the images are uploaded and an order is placed, the consumers' work is done. The difficulty of the consumers' task depends on the speed of their computer, the software they are using to capture, manage, and modify the images, and their familiarity with the entire process.

No consumer without a PC has access to the remote printing services. Currently, only about half of the households in the US have a PC. According to the America Online web site, they service over 17 million households worldwide. While there are other Internet service providers, America Online is by far the largest. In other words, there are many people in the US that simply still do not have access to the Internet and do not even have a PC in their home. For this reason, it is difficult, if not impossible, for them to use a digital camera.

For additional background, it should be noted that almost all digital cameras today use some form of removable memory card or "digital film memory" in one of two types.

The larger of the two types of memory is called CompactFlash, and is slightly smaller than a book of matches, containing up to 48 Megabytes of non-volatile memory called flash memory. Such flash memory will retain information without a battery or power connection. The second type of card is called "solid state floppy disc card" and is offered under the trademark SmartMedia. This is thinner than CompactFlash and has electrical connectors on the face of the card instead of along the edge, being slightly larger than a postage stamp and supporting only limited memory sizes.

There are other types of digital camera memory, but none are yet widely used today either because of their size or their late introduction into the digital camera market. As later explained, the system of the present invention is designed to interface with all types of removable memory cards by slight software and hardware modifications.

When the shutter button is pressed on a digital camera, a CCD or CMOS sensor captures light and color information from the scene. That information is converted into digital form and stored in the internal memory of the camera. Typically, the camera compresses that image information and stores it on a flash memory card in a standard format. Almost all digital cameras today store images in the Joint Photographics Experts Group or JPEG format. The JPEG format is popular due to its excellent compression capabilities for photographic images. Some photographers will carry multiple flash memory cards so that as they fill up one, they can replace it in the camera with an empty one and continue taking pictures.

The present invention is directed to obviating the above-described limitations and disadvantages of prior digital imaging and print processing systems and, indeed, for the first time making it possible for those without computers to use digital cameras in much

the same way as a traditional camera is used. An additional object of the invention is to provide a way to connect the camera memory directly with a remote printing service, providing improved print output and providing services and information to the digital camera owner.

OBJECTS OF THE INVENTION

The primary object of the invention, accordingly, is to provide a new and improved method, system, and apparatus that, unlike prior approaches, enables transmitting digital camera images to remote photographic printing and delivery locations without requiring the use of a PC, and in much the same way that traditional cameras are used, enjoying all the benefits of digital imaging, while retaining the simplicity and convenience of traditional photography.

Other and further objects are also hereinafter pointed out, being more particularly defined in the appended claims.

SUMMARY OF THE INVENTION

In summary, from one of its broad aspects, the invention embraces a method of transmitting photographer-generated digital camera images to remote automatic photographic printing and delivery locations, that comprises, generating digital images with a digital camera and storing the same on a memory card; removing the card from the camera and inserting the card into an appliance containing a microprocessor-controlled circuit responsive to the digital image information on the inserted card; transmitting such information from the appliance to a digital image server of a computerized remotely

located photo-processing order receiving station for uploading the received images at the station and automatically reproducing said images received at the station and printing them.

Preferred and best mode designs, embodiments and techniques are hereinafter presented in detail.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in connection with the accompanying drawings, Figure 1 of which is an isometric rendering of the Digital Film Developer (DfD), the preferred form of the system of the invention;

Figure 2 is an exploded view of the DfD showing the circuit board and connector for CompactFlash, SmartMedia, or similar removable media cards;

Figure 3 is a schematic of the preferred electronics for the DfD;

Figure 4 diagrams the setup and use of the DfD;

Figure 5 is an example of a suitable registration card that may be used in accordance with the invention to gather information required for the use of the DfD;

Figure 6 lays out the communication paths available to the DfD for transmitting the images in the film memory to the print processing center;

Figure 7 is a schematic diagram of a suitable print processing center for use in the system of the invention;

Figure 8 is a schematic of the image management portion of the processing center, illustrating where the images arrive and how they are managed;

Figure 9 is a diagram of the printing section of the print processing center;

Figure 10 is a diagram outlining the mailing operation of the processing center;

Figure 11 shows a suitable envelope and its contents as it may be prepared in the processing center;

Figure 12 illustrates the front and back sides of a photograph as printed and labeled in the processing center;

Figure 13 presents an example of a web page that lists some of the photographs taken during a specified time period;

Figure 14 presents an example of a web page wherein the photographer orders reprints from previously uploaded images;

Figure 15 is a view of the back of a digital camera at the time that a photographer is selecting the number of copies and final destination of an image before it is sent to the print processing center; and Figure 16 is an example of a suitable text listing in the flash memory card to indicate the number of copies of prints desired for each picture and the desired destinations for those prints.

DESCRIPTION OF THE PREFERRED EMBODIMENT(S) OF THE INVENTION

The system of the invention embodies two principal components. One component is a simple, portable "Digital Film Developer" (DfD) appliance or device that resides in the home or office of the user and is shown at CR in Figures 1 and 4. It is adapted to be activated by the insertion of an image memory card CFC removed from a digital camera DC, Figure 4, after taking the digital image, allowing such digital images to quickly and

conveniently be uploaded over the telephone line PHN to a remote server as by the communication paths of Figure 6. The server is part of the second component of the invention, and is shown in Figures 8, 9 and 10 as consisting of a computer-based photo-finishing operation that is possibly some distance from the user. At the photo-finishing lab, digital images are received, printed and mailed to the requested destination, which may often, but not always, be the home or office from where the images were sent.

As before indicated, the object of this invention is to make it possible for those without computers to purchase and use digital cameras in much the same way as a traditional camera is used -- without owning or requiring the use of a PC. The present invention, as earlier stated, enjoys all the benefits of digital imaging while maintaining the simplicity and convenience of traditional photography. The benefits include 1) reduction in the recurring cost of photography by eliminating the need for purchasing film and paying to develop the film, 2) the ability to delete unwanted pictures before they are printed, and 3) the superior image quality possible with digital cameras. In addition, prints are made on non-fading photographic paper suitable for framing or inserting into photo albums.

As mentioned above, the first component of the present invention is a small device CR, Figures 1 and 4, that sits at the home and receives its power from the wall outlet PWR and connects directly to the phone line PHN in the wall jack. The device CR, has a slot S that accepts either CompactFlash, SmartMedia or other flash memory cards CFC.

The present invention completely automates the process of uploading, printing, and delivering high quality prints back to the consumer. When a film memory card is

inserted into the DfD, the DfD uses an embedded processor and modem to dial through the existing telephone network into the image-receiving computer that is part of the remote computerized photo-finishing lab. Images stored in the memory card are uploaded through the modem to the server along with identifying information that indicates the owner of the images. A single image server may receive images from all over the country and perhaps from all over the world over the existing worldwide telephone network. The image server is connected to a photo-quality digital imaging station (for example, the Miléca HSP from Sienna Imaging), and the received images are enhanced, exposed onto photographic paper, and that paper is developed chemically and then cut to the requested size and inserted into envelopes. Each envelope is addressed and mailed back to the originator of the image data. Additionally, the present invention makes it possible automatically to mail copies of the print to either a single or multiple destinations with very little effort on the part of the photographer.

The advantages that the present invention gives to the photographer include convenience, improved image quality, and reduced cost. In terms of convenience, the invention only requires that the photographer consumer insert the digital film memory card into the DfD. The consumer does not have to drop off the film or mail it anywhere, so that there is no mail delay while the film travels to the photo finisher. Photographers also have no need to transfer the images to a home or office computer before prints are made. This saves photographers both time and frustration. As will be more fully later described, photographers using the invention will be able easily and conveniently to order multiple prints or reprints and will be able to have those prints sent anywhere in the world.

Image quality is improved because digital image capture devices like digital cameras are better at capturing detail over widely varying lighting conditions. Digital images can also be enhanced before printing. The phenomenon called red-eye, for example, a condition caused by the reflection of bright light from the strobe flash off of the retina of the photographic subject and back into the lens of the camera, while not removable from photographic film, can readily be removed from digital image data before printing. Additional enhancements are also possible, including color balance adjustment and adjusting or compressing the dynamic range of the image to provide more detail in the print.

Thus, in accordance with this invention, the photographer never has to print a bad picture again since images are reviewed on-camera, and unacceptable images are deleted before they are printed. Some digital cameras, indeed, have a menu system that appears on the LCD display on the camera back. Using the buttons and thumbwheels on the camera, the photographer can delete unwanted images, move images from one "album" to another "album" on the memory card, etc. Some cameras can also be programmed using a scripting language that allows developers to display specific menu items and selection items to the user of the camera. For instance, the Kodak DC260 uses the Digita operating system from FlashPoint Technologies and such can be programmed through scripts to build web pages, to give various choices to the photographer, and to add watermarks or indicia to the images stored in the memory card, as desired.

The present invention includes giving the photographer the choice of how many copies of each print to make, and where to send them. For instance, a family on vacation might choose to have copies sent to their home and also to their parents home so that

their parents can enjoy pictures of their grandchildren on vacation. These choices can be made during picture taking, as later explained. The choices can be displayed on the LCD of the camera as each picture is taken or reviewed. The flexibility of cameras like the Kodak DC260 allows those modifications to be made by a third party which means that it is not necessary to build a proprietary camera in order for consumers to have such choices while they are taking pictures. Providing a simple means for selecting number and destination of prints before prints are made provides a great convenience to consumers.

Returning to the drawings, Figure 1 shows two DfD cradle CRs, one on its side, with indicator lights IND, on a front surface, illustrating a memory flash card CFC in the process of being inserted into the slot S, after removal from a digital camera DC, Figure 4, with the process of transmitting images then beginning.

In the exploded view of Figure 2, the Digital Film Developer CR is shown as made up of a 2-piece enclosure that may screw together and that contains a printed circuit board PCB. The board PCB has 3 connectors fastened to it: one for the card CFC, one for power input from the wall mounted transformer PWR and another for the telephone connection through the cable PHN.

As an example, the before mentioned exemplary CompactFlash type I cards CFC are 43mm (1.7") x 36mm (1.4") x 3.3mm (0.13") in size. They hold non-volatile or "flash" memory that can be written and rewritten many times and can maintain stored information without a power source. Thus, when such a card is removed from the power source, the data is not lost.

A schematic diagram of suitable electronics on the printed circuit board PCB of Figure 2 is shown in Figure 3. The board PCB contains a microprocessor or microcontroller or other similar means MP for programmatically controlling the operation of the DfD cradle CR. This microprocessor MP interacts with and controls the other parts of the board PCB, including a modem MOD, optional external memory RAM, the before described indicator lights IND, a speaker SPK and additional buttons BUT and switches SW1 and SW2. The micro MP also interfaces with the card CFC when it is inserted into the cradle through interface logic IL and a flash card adapter CFA. The purpose of the microprocessor MP is to determine the state of buttons BUT, switches SW1 and SW2, the modem MOD, the phone line connected to the data access arrangement DAA through the phone jack at PHN and the card CFC. The processor MP may perform a variety of tasks depending on the determined state.

In addition to the above items, the board PCB also contains, either as part of the processor MP or as a separate item, at least a small amount of non-volatile memory NVRAM for holding the ID number or serial number of the device CR, uniquely identifying the customer's cradle CR.

A full electrical schematic of the board PCB is not shown here in order not to detract from the main features of the invention and also because such will be well understood from the above description by those skilled in the art. There are present-day external computer modems, for example, that contain the components shown in Figure 3, except for the interface logic IL and adapter CFA. Such logic and adapters, though not previously used in this combination, are well understood in the industry wherein devices

like the previously mentioned ImageMate and many laptop computers use such logic and adapters, though for their own different processors.

The primary task of the processor MP of the present invention is to deliver images from the card CFC to the order receiving station ORS of before-mentioned Figure 8. There are,however, several subordinate tasks required to accomplish this primary task, including dialing the phone number of the ORS, connecting to the ORS through the modem MOD, querying the card CFC to determine the number and size of the images contained in the card, initializing the transmission of the images as by using a well-understood file transmission protocol like KERMIT, XMODEM, ZMODEM, or FTP, modifying the card CFC to indicate which images have been transmitted, and hanging up the phone once the transmission is complete. It is believed also unnecessary to describe herein the transmission of the data in detail because methods of transmitting data through modems is so well understood and any of the well-known protocols is acceptable for the operation of the invention.

It should be observed again, that the invention does not require a "start" button on the cradle CR. When a PCMCIA card or flash card is inserted into a laptop computer, it is automatically activated and the computer begins interacting with it upon insertion and the cradle CR of the present invention has been constructed to work the same way. When the card CFC is inserted into the cradle CR, the electrical characteristics of the card connecting to the electronics in the cradle CR cause the cradle automatically to recognize that the card CFC has been inserted, and the card is then queried, the presence of images on the card verified, and then the transmission sequence is initialized.

Figure 4 illustrates the setup and use of the DfD CR appliance of this invention, being intended to make apparent one of the significant advantages of using the cradle CR – that of extreme simplicity of use.

The setup of the cradle CR moreover must be done just once and it requires four steps. The photographer first sets the cradle CR on a tabletop or counter convenient to both power and a phone line. In step 2, the photographer attaches the phone cord both to the wall jack and the cradle CR. In step 3, the photographer plugs a wall transformer into a power outlet on the wall and plugs the other end of the power cable into the cradle CR. Finally, the photographer fills out the registration card such as shown in Figure 5, and mails the card, or calls a phone number to register with an operator, or registers electronically using a web page prepared specifically for registering the cradle CR.

Although there are some advantages to registering the cradle before using it, the registration does not have to be performed in advance. Since each cradle CR, as before-mentioned, contains a unique identification code, that code can be transmitted with each communication session to the ORS of Figure 8. The ORS can tag each received image with the ID number of the cradle so that when the registration information finally becomes available, it can be attached to the received images. Typically, however, the photographer will register the device CR before using it, and once the registration is complete the photographer can order prints of digital images to be created and mailed to him by exercising the following sequence of events.

After taking digital pictures, the photographer turns off the digital camera DC, removes the memory card CFC and places the card CFC in the cradle CR. The cradle CR recognizes the insertion of the card CFC, checks for the existence of images in the card

CFC, dials the ORS of Figure 8, transmits the images to the ORS, and then indicates to the user that the transmission is complete, using either the indicator lights IND or the speaker SPK or a combination of the two. Once transmission is complete, the card CFC can be removed and placed back inside the camera.

Referring back to the previously mentioned exemplary registration card of Figure 5, such may conveniently be used to gather information required for the use of the cradle CR and for mailing prints back to the photographer.

This registration card may, for example, be printed on the back of a business reply address card which can be folded in half and placed in the mail. Some photographers may want to register immediately and may use either a secure web site with a registration page or may speak directly to an operator. The information shown in Figure 5 and collected from the photographer is recorded in a database electronically accessible from the print processing center using industry standard methods well understood by those skilled in the art. The link between the cradle CR and the photographer in this embodiment of the invention is the identification number ID of the cradle CR. This number ID is kept with the rest of the registration information and is preferably also electronically attached to each image uploaded from the cradle.

The images are processed and printed according to the specifications of the photographer, as to the default number of copies, finish, and size on the registration form at DFP – a certain size paper with a specific finish, either glossy or matte, and some number of copies. Each image received from the cradle will be printed according to this default unless the photographer has specifically requested a different size, number of copies, or finish. The selection process for non-default treatment of prints will later be

discussed in connection with Figure 15 illustrating how on-camera selection may be made, if desired. By default, all prints will be mailed to the address given by the owner of the cradle CR. This address is specified in the "user information" section UI of the registration card.

Additional information required to implement the system of the invention includes some form of automatic payment, like a credit card account, that can be charged for each print made, and the names and addresses of others to whom the photographer would like to send prints from time to time. In the payment section PM, the photographer may indicate a credit card account to be billed for prints made.

In the "additional mailing addresses" section AMA, the photographer may set up additional addresses for mailing. Each of these addresses will be assigned a unique nickname by the photographer, useful as a shortcut to refer to the addresses for on-camera, web-based, or over-the-phone destination selection. In other words, if the photographer would like to order reprints of specific images to be sent to a specific friend or relative from time to time, that address would be added to the registration card, choosing a nickname uniquely to identify that address. Then, when ordering reprints by phone or over the web, the photographer may ask that the reprints be sent to the address associated with that nickname.

Any time that the photographer would like to add new addresses to the list of potential recipients, the photographer may call an operator or supply the nicknames and addresses to a web page set up for that purpose. Additional "Add Address" mail-in cards (not shown) may also be sent with prints on occasion, to allow addresses to be added to the photographers address book through the mail.

Even though registration typically happens before the cradle CR of Figure 1 is used, this, as before noted, is not a hard requirement. Each uploaded image can be tagged with the cradle identification number ID and those can be correlated upon receiving the registration information.

Figure 6 illustrates preferred communication paths available to the cradle for transmitting the images in the film memory to the print processing center. The modem in the cradle uses the POTS or plain old telephone service to communicate with the print processing center in the preferred embodiment, minimizing cost of hardware and the proliferation of the POTS network around the world. Additionally, due to the cost of long distance phone calls, it is possible to have all of the cradles call local phone numbers so that there are no per-minute charges when downloading the images. Many internet service providers such as America On-Line, Microsoft, and MindSpring, indeed, have nationwide networks of local phone numbers which provide local call access to their customers, and may also be used herein for this service.

As designed, the invention permits the cradle to travel from office to home because it uses the POTS network. It may also be brought on vacation so long as the location provides access to the same POTS network. The cradle preferably always dials a toll-free number which can be established in a way that it works from any site in the US and Canada. Using automatic number identification (ANI), it is also possible to tell in which calling area the cradle is located. If a local number is available in that area, the ORS of Figure 8 can indicate to the cradle that it can call back on a local number to reduce the cost of the call. When the cradle hangs up and dials the local number, a modem answers and the information and images are received by a computer in the local

area, converted to data packets that can be sent over the internet through a single permanent connection at that local computer LCO. This is also a technique well understood and used for other but similar purposes in many industries to reduce expenses.

Another additional communications technique, also well understood and used by almost all Internet Service Providers, is to establish an internet connection over the phone line and modem using the Point-to-Point Protocol (PPP) or Serial Link Internet Protocal (SLIP). Once such a connection is established, packets of data can be transmitted directly from the cradle and routed using the TCP/IP or UDP internet protocols to the print service center.

All such communication techniques are available to a modem-based device and may, in accordance with the invention and for its specific purposes, be used to send images to the print processing center PPC shown in Figure 7, a schematic of the print processing center. The center PPC contains image management hardware and software IM, printing hardware PR, and mailing equipment MC. It is here that the images are received, stored, enhanced, and imaged onto photographic paper. The paper is chemically processed, back-printed, cut, sorted, stuffed into envelopes, and mailed or shipped back to the photographer. In this embodiment, all of this equipment is co-located. However, it is also possible to locate the image archive away from the rest of the equipment, if necessary.

As before discussed, Figure 8 is a schematic of the image management portion IM of the processing center PPC and shows where the images arrive and how they are managed.

There are two primary sources of image data – modems and the internet. Each cradle calls a bank of modems MBK which typically reside in the print processing center. Those modems receive the data arriving from the cradles and pass it on to the previously described order receiving station ORS. The ORS consists of one or more computers, each with one or more processors which control the modems MBK and can remotely control the cradles through the modems MBK.

As earlier discussed, furthermore, it is possible for the cradle to call a local service provider or a phone number local to their telephone service area. At the called location, there a computer may be provided as shown in Figure 6 that receives the call via a receiving modem in the local office and converts the data to packets that can be communicated over the Internet. The purpose for having such a local service is to reduce the cost of the phone calls made by the cradle. In this case, the image data is received through the Internet but ends up within the ORS. The path that the data travels is unimportant so long as the data is received in a timely manner and without errors. Once the image is received on the ORS, it takes a predetermined path through the rest of the print processing center. The image data is correlated with the photographer who captured that image using the ID or serial number of the cradle, and once associated with the right photographer and assigned an ID, the image is sent to an image storage management computer ISM. This ISM may be a single computer or it may be multiple computers, being responsible for retrieving images as needed for either printing, viewing on the web, or archiving. The ISM also stores the database of photographers information and images in the Temporary Image Storage TIS. Such a database is required so that if a photographer requests a web page containing thumbnails of all images taken within the

last year, the ISM can look up the ID numbers of the photographs and then retrieve the thumbnails of those photographs to build the web page. The art of building web pages from data stored in databases is common knowledge and some databases, like Oracle Version 8i, advertise the ease of deployment of database information on the Internet. The TIS serves as a place to store images as they arrive before they are cataloged and thumbnails are created, and in the preferred embodiment, the TIS may be of the magnetic disk storage type which is fast and can support a high bandwidth connection between the TIS and ISM.

The short term Archival Storage JBX serves many purposes. It may, for example, be either a single magnetic disk or a multi-terabyte hierarchical storage system which allows one of millions of images to be retrieved within a matter of seconds at the time the image is needed. The words "short term" is used here to indicate that the images are not necessarily stored for more than a year., Thumbnails, however, might be stored long term on the JBX. A product called "SureStore 1200 EX", for example, stores up to 1.2 Terabytes of information on up to 238 5.2 GB magneto-optical (MO) disks. These disks are robotically inserted and removed from up to 10 MO drives within a matter of seconds. Products like Hewlett-Packards MO library thus make it possible to store millions of images in a way that they can be retrieved quickly as needed.

These systems provide the capability for images to be stored for years at the request of the photographer, on low-cost, long-life media like CD-ROM's. Connected to the IMS may be a CD-R burner CDB, such as the Cedar Desktop Publisher available from Microboards Technology Inc of Chanhassen, Minnesota. The CD-R burner can create multiple CD-ROM's which hold up to 650 Mbytes of information or about 1300

megapixel images each. The CDB can also print information and tracking codes like bar codes directly on the surface of the CD-ROM to make retrieval of the CD easier when needed.

After images are cataloged and saved in the TIS and JBX, they are forwarded to the printing part of the operation PR shown in Figure 9. Each image to be printed is stored on the Print Spooler and Enhancement computer PSE. The computer PSE may be any one of hundreds of brands of general purpose computers, including but not limited to an Octane brand computer from Silicon Graphics Inc, located in Mountain View, California. The PSE is responsible for spooling and organizing images which are queued to be printed. As each image is about to be printed, the image may be enhanced in a number of ways, including artifact removal, such as the before-described red-eye removal, and the resolution of the image might be increased or modified to match the resolution of the printer. The contrast or brightness of the image may also be adjusted on the PSE, and additional enhancements, if any, are also possible as desired.

The print driver PD computer is next in line to receive the images. After all the enhancement operations are completed on the PSE, the PD receives the images and sends them one at a time to the printer RTR. The print driver PD is usually either a computer that runs, for example, the Windows brand operating system or, as another example, an Apple brand computer running the Macintosh operating system. Print driver software PD called MAC FPToolbox for the Apple Computer is available from Sienna Imaging Inc of Eglewood, Colorado.

It is possible, moreover, to have a single computer perform multiple operations in the print processing center. For instance, if an Apple Macintosh were used for image

storage management ISM, order processing ORS, and print spooling and enhancement PSE, it may also be used as the printer driver PD. It is not likely, however, that such a system would support many photographers and incoming images at once and this is the reason that the PPC of the present invention is shown with multiple computers performing each of the different functions.

The printer RTR is a photographic printer which focuses light onto photographic paper in order to create images on the paper. A suitable type of photographic printer RTR is available from Sienna Imaging Inc. Sienna manufactures a high-volume digital printer called the "Mileca HSP", which can receive digital images from the PD and print 1000 images per hour onto rolls of photographic paper. There are also other photographic quality printers available, as well.

While photographic printers are the preferred form of printer for this invention, it is also possible to use a dye sublimation printer like the DS 8650 from Eastman Kodak or any other printer that has the capability of printing long-lasting, high-quality, continuous tone photographic prints.

After printing, the roll of photographic paper is sent to a chemical processor CP such as the Agfa VSP 50 available from Agfa-Gevaert N.V. of Mortsel, Belgium. Many printers, including the FP5000 Fotoprint from Sienna Imaging, can image onto photographic paper and chemically develop that paper in the same machine, thus combining the operation of the RTR printer and the CP chemical processor.

Information can be printed on the back of the print either before or after chemical processing using a printer LP. The before-mentioned Mileca printer from Sienna Imaging, as an illustration, has a back-printing option – a mechanism that can be added to

the Mileca printer that allows information to be printed on the back of the photographic paper as it rolls through the printer. In this case, the functionality of the back printer LP is combined with the functionality of the photographic paper printer RTR. After printing both sides of the photographic paper and developing the paper, each image is then cut into individual photographs, as by well-known photographic processing machines, such as the Package Cutter from Lucht, Inc. of Bloomington, Minnesota.

As part of the complete system of the invention, it is necessary to print out an invoice and mailing information for each photographer that can be shipped with the prints. Such an invoice INV is shown in Figure 11 behind the prints. While the information can be printed on regular paper using any inkjet or laser printer, it would also be possible to print the information directly on the roll of photographic paper so that all of the information, including the invoice, mailing address, and photographic prints, would be kept together throughout the printing process. Stacks of prints, with the mailing address on top and the invoice either before or after the prints would then arrive together at the end of the printing process PR, as shown in Figure 9.

A suitable mailing operation of the processing center is shown in Figure 10. Once the photographs are printed, developed, and cut, they must be sorted and inserted into individual envelopes to be mailed to the photographer or other designated addresses. Sorting at station SRT consists of separating each photographers prints into separate piles for insertion into envelopes at ENS. It is often done manually, but can also be done by machine using bar codes printed, for example, on the backs of the prints using the printer LP indicated above. If window envelopes are used and the top item on the stack of photographs is an appropriately aligned address card, the envelopes will not require

custom address printing. Many companies, including Bryce Office Systems, of Oxford Connecticut, sell suitable envelope printing machines that can print thousands of envelopes per hour. The envelopes can be stuffed by hand or by machine at ENS. Various manufacturers, including Pitney-Bowes, Inc. of Stamford Connecticut, offer custom, high-volume sorting and mailing machinery to the US Postal Service and others. Bar codes or other indicia located on each item can associate it with an envelope and the equipment can also weigh and affix postage to and print a USPS barcode on each envelope, as desired. Other commercial equipment is also readily available including the Auto Packager from Lucht, Inc., which cuts and collates the prints, inserts them into an envelope, addresses the envelope and sorts automatically.

Once the envelopes are stuffed and sealed and placed in a carrier BOX, they are ready for transport to a mail carrier MC, such as the USPS, UPS, or Federal Express, depending on the required mailing service. For overnight mailing, any of these three services would suffice.

Figure 11 shows an illustration envelope and its contents as it might be prepared in the processing center of the invention for the overall system contemplated therefore. The front of the envelope shows the return address, the address of the photographer, postage, and additional instructions to the mail carrier. Inside each envelope is a stack of one or more photographs accompanied by an invoice. INV. Individual photos may also be mailed as postcards to reduce postage costs, but multiple pictures may be mailed in envelopes as shown.

In Figure 12 the front and back sides of a typical photograph PHT preferred by the invention is shown as printed in the processing center. A variety of information may

appear on the back of the image, including the time and date TD that the photograph was taken, along with a photo ID number PID and photographer ID number UID that uniquely identifies the photograph. The photographers name NAM might also be printed, if known, as well as the resolution of the image RES; or, alternatively, the maximum size at which the picture can be printed without noticeable artifacts. A bar code BID is shown printed on the back that uniquely identifies the print. This bar code BID might be a direct encoding of the photo and the photographer's IDs.

It is contemplated that, in the future, some digital cameras may contain location sensors, like Global Positioning Sensors or GPS devices which can tell the camera where the picture was taken. If such information is also available, it may readily be printed on the back, either in the form shown as latitude and longitude, or with the name of the nearest town or city.

Finally, it is possible to indicate how many copies of that photo have been printed up to that time and to whom those copies have been sent -- this information serving as a reminder to photographers when they decide to order reprints.

Additional information may also be printed on the back of the photograph if desired including, for example, the type of camera used in capturing the image and the settings on the camera at the time the photograph was taken. Advertising information and contact phone numbers for reprint services and other purposes may also be printed on the back of the photograph – this flexibility being a significant advantage of the technique of the invention. Because the images are taken directly from the memory card on which the image was initially stored through the cradle in the photographer's home or other site, it

is readily possible to have the above information transmitted to the print processing center directly and recorded in a database and then on the print.

A further benefit flowing from the present invention is that photographers have all the information they need on one piece of paper to place an order for high-quality enlargements -- each photo having unique identifying numbers and the reprint order phone number printed on the back of the photo. Photographers know what picture they have in their hand because they can see it, and they have unique identification information and also the phone number they need to call to place an order. While it is possible today to get a reprint or enlargement by taking a photograph to a photofinisher, who then scans the image and reprints it, such enlargements are of reduced quality due to the scanning and reprinting process. At the print processing center of the invention, on the other hand, both the original and enhanced image data can be stored and the reprints and enlargements are of the same quality as the original prints. Ordering reprints by phone is convenient because it doesn't require a trip to the photofinisher, and such can be easily ordered by phone using an interactive voice response IVR system similar to the one connected to the ORS in Figure 8, or by mail, or on the Internet through a web-based ordering system.

While it is not necessary here to describe all the details of such a reprint ordering IVR system, there are many suitable interactive voice response development systems available today, such as Visual Voice, an IVR development system available from Artisoft Corporation of Cambridge Massachusetts. A Windows based computer may be used in conjunction with Visual Basic from Microsoft Corporation and with a computer telephony board from, for example, Dialogic Corporation of Parsippany, New Jersey, to

create an IVR application for adding orders to a database. As previously mentioned, all data necessary to place the order may be provided on the back of the print itself and is numeric with the exception of the nicknames for the destination. A destination nickname could be chosen from a list or determined using one of several methods which use the touchtone keys on a telephone for alphabetic input.

Once the images are uploaded to the ORS and stored at the print processing center PPC of Figure 7; those images can also be made available to the photographer through the World Wide Web or Internet. Figure 13 shows an example web page which lists some exemplary photographs taken during a specified time period. The web page shows navigational aids NAV which allow the photographers to select dates or sets of pictures they are interested in reviewing. The thumbnail images TBN remind the photographers which picture is which, and additional information is provided next to each thumbnail. Through this web page, the photographer's information can be updated, additional prints or enlargements can be ordered, audio or textual captions can be associated with the images or the images can be deleted, all with great flexibility and versatility enabled by the technique of the present invention.

As a further illustration of such versatility, if photographers clicked on one of the thumbnails at TBN, they would be shown another page like Figure 14 which is specific to the image they selected. This new page would preferably show a slightly larger thumbnail, additional information about that image, and provide a form which would allow the photographer to order reprints or enlargements, as well as specify the location to which to send the ordered prints.

Previewing images and ordering reprints online is commonplace today and can be done, for example, through either Sony Corporation's or Eastman Kodak's PhotoNet sites on the Internet. These sites are respectively at http://imagestation.sony.com/ and http://kodak.photonet.com/. Such online service added to the print processing center of the present invention for convenience of the photographer is unique due to the normal manner in which the image data is gathered and the information made available to the photographer at that site. The Kodak, Sony and other PhotoNet sites of course, have no way of knowing if the image was taken with a digital camera or created with drawing software when it is uploaded through the Internet.

Figure 15 shows a typical back of a digital camera at the time that a photographer, in accordance with the invention, is selecting the number of copies and final destination of an image as previously outlined, before it is sent to the print processing center.

When the photographer takes pictures with most digital cameras, those images are stored in the flash or other digital memory as previously described. Many cameras contain a liquid crystal display or LCD panel like the one shown in Figure 15 to display pictures as they are taken or to allow the photographer to review pictures taken earlier. The LCD is also used to allow the photographer to change settings on the camera, such as exposure settings, picture quality – which affects picture file size in memory – and other settings.

Some digital cameras, like the Kodak DC220, DC260 and DC265, furthermore, use an internal operating system in the camera that can be programmed by the camera user. In these cameras, Kodak uses the Digita operating system from FlashPoint Technology, allowing photographers to develop complex programs including scripts that

can create and store web pages alongside the images in the camera or modify the settings in the camera.

It is possible also to create scripts that ask questions or allow the photographer to make selections during the picture-taking process. For instance, it is possible to write a script that asks how many copies of a given picture should be made, at what size that picture should be printed, and to whom to send the picture. Each of these items could be chosen from a list that is stored on the camera in the memory card. When the memory card CFC is inserted into the cradle CR of Figures 1 and 4, it is then possible to download such scripts into the place on the card that the camera looks for them. In the case of the above-identified Kodak digital cameras, for example, those scripts are stored in the system directory inside the main directory of the card. When the card is in the cradle sending images to the print processing center, the ORS of Figure 8 can also send scripts back to the cradle. One possible script allows the user to select a quantity, print size, and destination for each print. All sizes and destinations that can be chosen with the script are taken from the database at the print processing center. When photographers choose a destination for their pictures, the selection list is from the list they gave during registration, and the sizes selection list is based on the capabilities of the print processing center. This two-way communication between the camera and remote print processing center is a significant advantage of the present invention and is unique and unduplicated by any other print service.

With the card in the cradle and the same connected to the print processing center, it is possible to create the before-described thumbnails from the images in the card and then to create a web page within the card which uses those thumbnails for browsing

through the images and reviewing the order placed when the card was put into the cradle. Again, this capability is unique to the present invention and takes advantage of the normal two-way communication between the card and the print processing center. No current technology is known that can provide this level of remote control over the card or camera.

Figure 16 is an example text listing which may be contained in the flash memory card to indicate how many copies to print of each picture and where to send those copies. The information about how many prints, the format and size of those prints, and where to send them is communicated from the camera to the print processing center as before explained. This means that the database created by the photographer on camera must be placed on the card in order to communicate the photographer's requests back to the print processing center. One way for enabling such communication is to create a text file on the camera memory card containing the photographer's selections associated with each image, such as the form of text file of Figure 16, containing a line for each size/format ordered for each image. On that line, in order, is the name of the image, the number of copies requested, the size or format in which the image should be printed, and finally the nickname for the destination of that image, as earlier discussed.

Additional information may also be stored in that file, including the date and time of the last transmission. Since this database or file can be modified by both the camera or the ORS at the print processing center, it can also be used as a means for communication. Such a file can also be used by camera manufacturers who do not have an open operating system, such as Digita, on their camera. If a camera manufacture chooses to collect information from the photographer and to format it the right way, leaving it in a file on

the flash card, the photographer can still use the cradle of the invention for ordering prints.

The preferred embodiment of the present invention is thus a cradle which accepts the digital "film" memory and has phone line communication with the print processing center. Another method of capturing and communicating the images from the camera to the print processing server, however, is to use either wireless or wired communication from the camera to the cradle. Once the camera is connected to the cradle, the cradle can operate as previously described except that the cradle accesses the cameras memory through the camera processor instead of directly as in the above examples. Many cameras have serial ports for communication such as those of Eastman Kodak and Sony Corporation. In addition, companies such as Fotonation, Inc. based in San Mateo, California, USA and Ixla, Inc, Danbury Connecticut, provide computer-based communications software for connecting to most digital cameras through a serial port. An 8051 microprocessor MP shown in Figure 3 as of the type which can be purchased from many companies, including Intel Corporation of Santa Clara, California, typically supports two serial ports enabling one to be assigned to a modem, and the other one, to camera communications. If wireless communication is preferred, it is possible to use one of many technologies available for wireless communication, including, for example, the BlueTooth communication specification created by an industry consortium made up of Intel, Ericsson, IBM, Nokia, and Toshiba for communication between the cradle and the camera. IrDA infrared communication is also possible and is also an industry standard supported by many companies. Serial or IP protocols can be used on top of either of these communication means, along with file transfer protocols like FTP for moving image and

other files back and forth between the camera and the cradle, and eventually to the print processing center.

Still an additional modification to the present invention is to use an Ethernet controller instead of a modem for communication. There are many homes and offices today which have a computer network installed. The most popular type of network is called Ethernet. Many companies, including 3COM Corporation, of Santa Clara, California, sell Ethernet networking equipment and chipsets. Ethernet hardware is inexpensive, with a typical network interface card or NIC costing as little as $15-$20 US. The addition of Ethernet hardware, an LCD panel and a few buttons to the cradle CR (for selecting an Ethernet address), allows the cradle to be connected to an Ethernet hub to take advantage of an existing network. Alternatively, a network which has a Dynamic Host Configuration Protocol server or DHCP server requires no LCD panel or buttons, since those are only required for setting up the IP address used by the Ethernet card. The benefit of such a modification would be that a phone line is not required, and the speed of communication is much higher than through a modem. Communication through the Ethernet hardware is very similar to modem communication, and similar protocols may be used, like FTP or ZMODEM for transferring files.

Another important distinction available in accordance with the methodology of the invention, is that it is not always necessary physically to move memory from the camera to the DfD. If the DfD has buffer memory for temporary storage of images, and if it is possible to communicate using some means including but not limited to wireless radio, infrared, or direct cable connection, the DfD can still complete its task of uploading images to the print processing center without requiring the removal of memory

from the camera. Through such a direct or wireless connection, the images themselves can be stored in the buffer memory of the DfD and then the operation of the DfD is unchanged from the situation where the memory is physically inserted into it.

The earlier described back of print information option provides the only system that has access to much of the information printed on the back of the camera. For instance, no other system knows precisely when the picture was taken. They only know when the film was taken into be developed. Also, no other service today archives the image after printing. The invention enables printing an ID on the back of the print that allows the photographer to order reprints without sending in negatives.

The before-described two-way communication with the camera memory of the invention is a further novel feature. Particularly, the invention makes it possible to download to the camera a new list of nicknames of people to whom one wishes to send prints. Other information can be put back into the memory, including an invoice for most recent print order or special offers for batteries, and the like. In fact, one can also download new operating system enhancements into the camera through the memory card automatically. Today, downloading a new enhancement takes several steps and is not automatic. In addition, a dock can be provided for the camera that both recharges the batteries and transmits the images to our service.

Further modifications will also occur to those skilled in this art and such are considered to fall within the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A method of photographer transmitting of digital camera images to remote automatic photographic printing and delivery locations, that comprises, generating digital images with a digital camera and storing the same on a memory card; removing the card from the camera and inserting the card into an appliance containing a microprocessor-controlled circuit responsive to the digital image information on the inserted card; transmitting such information from the appliance to a digital image server of a computerized remotely located photo-processing order receiving station for uploading the received images at the station; and automatically photographically reproducing said images received at the station and printing them on photographic print paper.

2. The method of claim 1 wherein, the transmitting is effected over telephone lines between the appliance and the remote station.

3. The method of claim 2 wherein, under the microprocessor control, the insertion of the card is recognized and identified, the existence of digital images in the card verified, the telephone of the station dialed, the transmitting of the images over the telephone lines from the appliance to the station effected, and indicating at the appliance that the transmission has been completed.

4. The method of claim 3 wherein, after said transmission, the card is removed from the appliance for reuse in the camera.

5. The method of claim 3 wherein the photographer, prior to removal of the card from the digital camera, has provided selected digital order information thereon including one or more of ID, number of copies to be printed or reprinted at the station, the deletion of unwanted images, print size and finish, and requested destinations for delivery of the prints, and effecting management processing at the station responsive to said order information for complying therewith.

6. The method of claim 5 wherein a text file is created on the memory card containing selections of the photographs oriented with each image.

7. The method of claim 5 wherein digital script information is transmitted from a data base at the remote station back to the appliance, providing two-way communication therebetween the photographs and the remote station.

8. The method of claim 7 wherein, with the card inserted in the appliance, creating thumbnails from the images in the card and creating a page within the card using those thumbnails for browsing through and reviewing the print order.

9. The method of claim 5 wherein the insertion of the card into the appliance automatically initiates the microprocessor control.

10. A method of transmitting photographer generated digital camera images to remote automatic photographic printing and delivery locations, that comprises, generating digital images with a digital camera and storing the same at the camera; the stored

images from the camera into an appliance containing a microprocessor-controlled circuit responsive to the communicated digital image information; transmitting such information from the appliance to a digital image server of a computerized remotely located photo-processing order receiving station for uploading the received images at the station; and automatically photographically reproducing said images received at the station and printing them on photographic print paper for delivery.

11. The method of claim 10 wherein the transmitting is effected over telephone lines between the appliance and the remote station

12. Apparatus for transmitting photographer-generated digital camera images to remote automatic photographic printing and delivery locations having, in combination, means for generating digital images with a digital camera and storing the same on a removable memory card; an appliance provided with a slot for receiving the memory card after removal from the camera and having an embedded microprocessor-controlled circuit responsive to the digital image information on the card when inserted into the slot; a communication path for transmitting such information from the appliance to a digital image server of a computerized remotely located photo-processing order receiving station; means for uploading the received images at the station; and means for automatically photographically reproducing said images received at the station and printing them on photographic print paper.

13. The apparatus of claim 12 wherein, the communication path for transmitting is the telephone lines between the appliance and the remote station.

14. The apparatus of claim 13 wherein, under the microprocessor control, means is provided operable upon the insertion of the card for recognizing the existence of digital images in the card, means for dialing the telephone of the remote station, means for thereupon transmitting the images over the telephone lines from the appliance to the station, and means for indicating at the appliance that the transmission has been completed.

15. The apparatus of claim 14 wherein said circuit comprises a telephone modem, indicator lights, a speaker and memory for holding an identification number for the appliance.

16. The apparatus of claim 14 wherein the digital camera is provided with means for enabling the photographer, prior to removal of the card from the digital camera, to select digital order information including one or more of ID, number of copies to be printed or reprinted at the station, the deletion of unwanted images, print size and finish, and requested destinations for delivery of the prints; and the remote station is provided with management processing responsive to said order information for complying therewith.

17. The apparatus of claim 12 wherein means is provided for automatically printing desired information relating to the images on the back of the image reproduction.

18. The apparatus of claim 12 wherein means is provided for enabling two-way communication along said communication path with the camera memory.

19. The apparatus of claim 18 wherein means is provided for downloading information to the camera, such as lists of people to whom image reproductions are to be sent, order, and/or operating system enhancements.

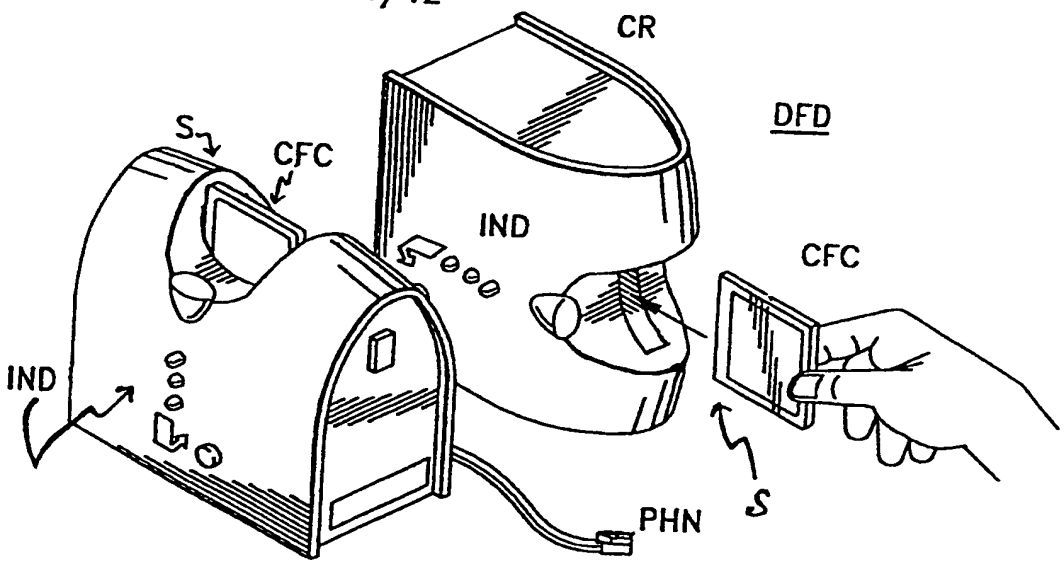
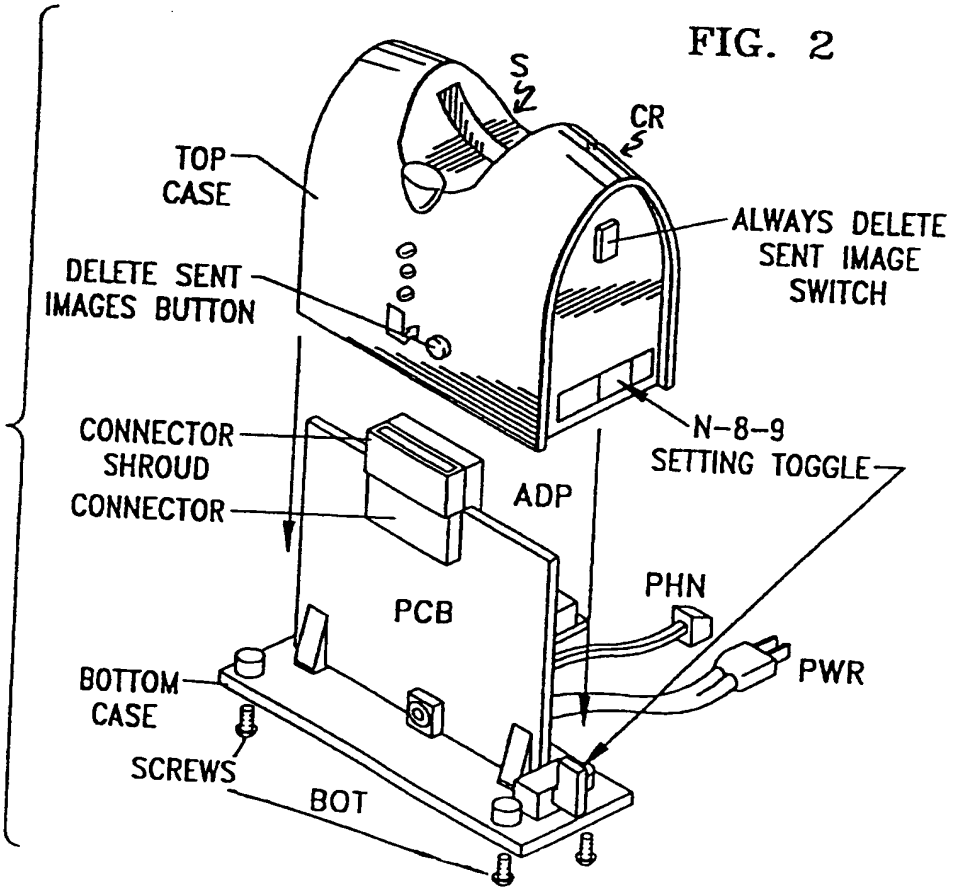

CR
DFD
S
CFC
IND
CFC
IND
PHN
S

FIG. 1

FIG. 2


S
CR
TOP CASE
ALWAYS DELETE SENT IMAGE SWITCH
DELETE SENT IMAGES BUTTON
CONNECTOR SHROUD
CONNECTOR
N-8-9 SETTING TOGGLE
ADP
PHN
PCB
PWR
BOTTOM CASE
SCREWS
BOT

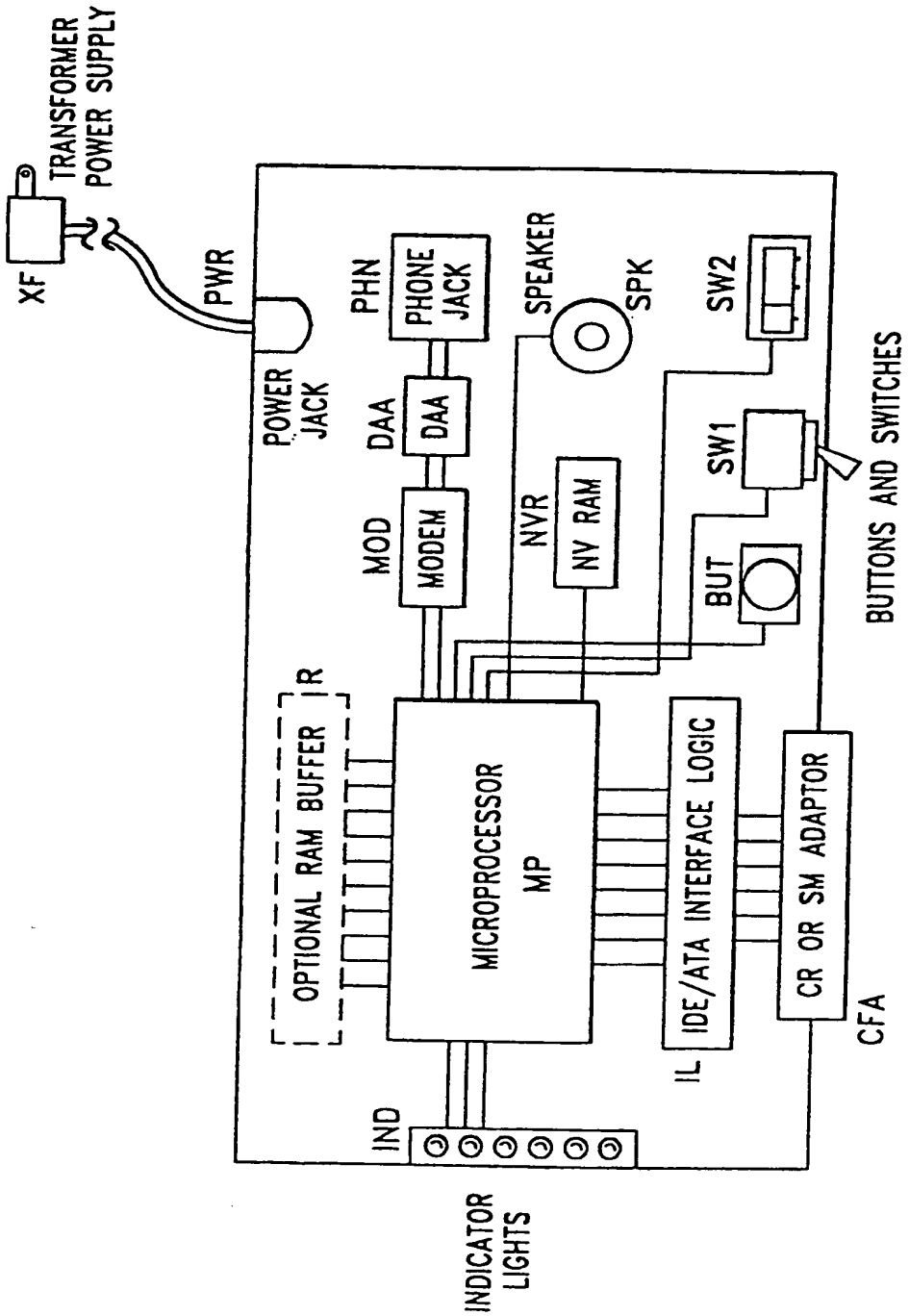

TRANSFORMER POWER SUPPLY
XF
PWR
POWER JACK
PHN
PHONE JACK
DAA
DAA
MOD
MODEM
SPEAKER
SPK
NVR
NV RAM
SW2
SW1
BUT
BUTTONS AND SWITCHES
OPTIONAL RAM BUFFER
IR
MICROPROCESSOR MP
IDE/ATA INTERFACE LOGIC
IL
CR OR SM ADAPTOR
CFA
IND
INDICATOR LIGHTS

FIG. 3

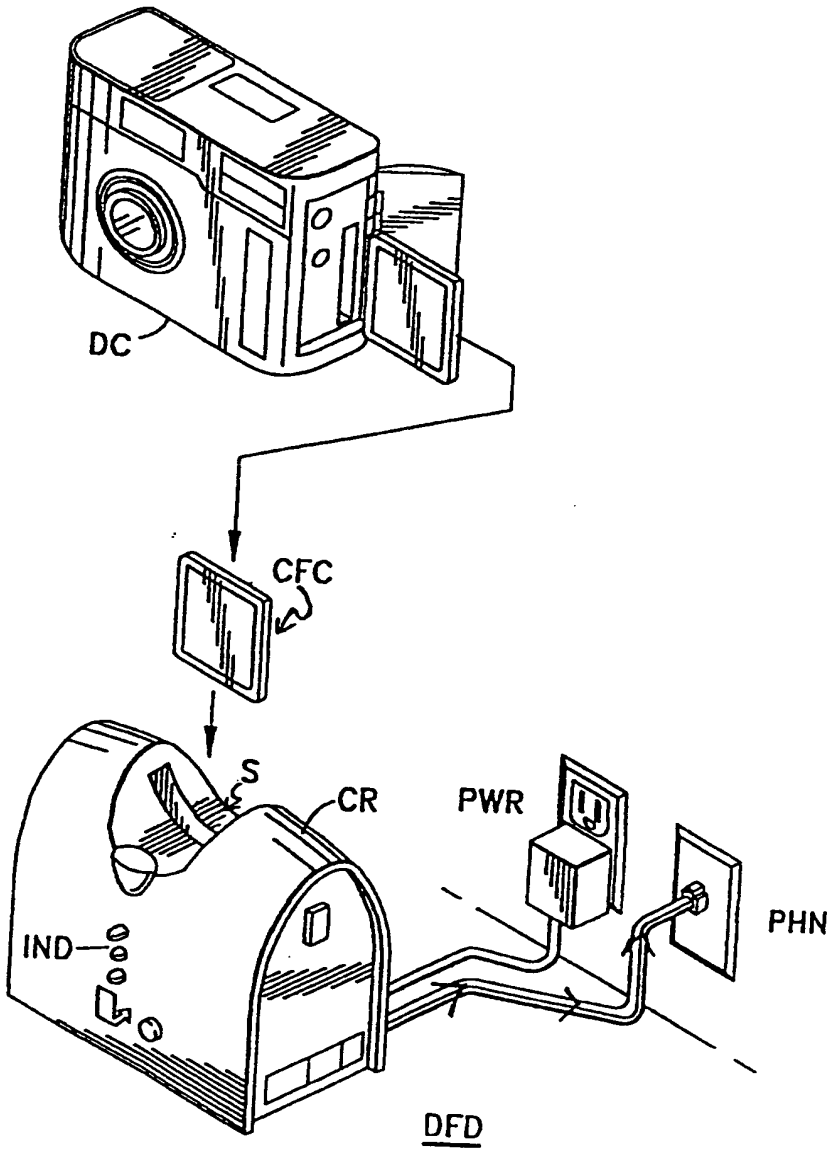


FIG. 4

FIG. 5

REGISTRATION CARD
FOR
DIGITAL FILM DEVELOPER
ID # 18459328

USER INFORMATION - THIS IS THE DEFAULT MAILING ADDRESS FOR IMAGES PRINTED USING THE DIGITAL FILM DEVELOPER.

NAME:_____

STREET ADDRESS:_____APT. NO.____

CITY:_____STATE:_____

ZIP:_____-_____

CREDIT CARD INFORMATION

TYPE VISE MC AMEX DISC

NUMBER:_____

EXPIRES:___/____

PERMISSION IS GIVEN TO CHARGE THE ABOVE CREDIT ACCOUNT FOR PRINTING IMAGES UPLOADED TO THE DIGITAL FILM DEVELOPING SERVICE THROUGH THE DIGITAL FILM DEVELOPER. USER VERIFIES THAT THEY HAVE THE RIGHT TO REPRODUCE ALL IMAGES UPLOADED USING THE DIGITAL FILM DEVELOPER. (WPC WILL NOT KNOWINGLY PRINT PHOTOS WITHOUT PERMISSION OF THE COPYRIGHT OWNER.)

SIGNATURE:_____

PREFERENCES

DEFAULT PHOTO SIZE: ◇3.5X5 ◇4X6 ◇5X7

DEFAULT COPIES PER PRINT: ◇1 ◇2 ◇3 ◇4 ◇OTHER

DEFAULT FINISH: ◇GLOSSY FINISH ◇MATTE FINISH

ES

ADDITIONAL MAILING ADDRESSES (YOU CAN SEND ANY IMAGES FROM OUR SERVICE DIRECTLY TO THE FOLLOWING ADDRESSES). THE NICK-NAME WILL ALLOW YOU TO REFER TO THE ADDRESS WITH A SINGLE WORD OR PHRASE. THE NICKNAME MUST BE DIFFERENT FROM ALL OF THE OTHER NICKNAMES, BUT CAN BE THE SAME AS THE NAME.

EXAMPLE: NICKNAME (NO MORE THAN 16 LETTERS): GRANDMA J.____
NAME: JUDY JOHNSON
ADDRESS: 1234 IVY LANE, APT 237
CITY: SMALLTOWN STATE: CA ZIP: 99999-1111

NICKNAME:_____
NAME:_____
ADDRESS:_____
CITY:_____ STATE:__ ZIP:_____-____

NICKNAME:_____
NAME:_____
ADDRESS:_____
CITY:_____ STATE:__ ZIP:_____-____

NICKNAME:_____
NAME:_____
ADDRESS:_____
CITY:_____ STATE:__ ZIP:_____-____

NICKNAME:_____
NAME:_____
ADDRESS:_____
CITY:_____ STATE:__ ZIP:_____-____

WO 00/69164

PCT/IB00/00400

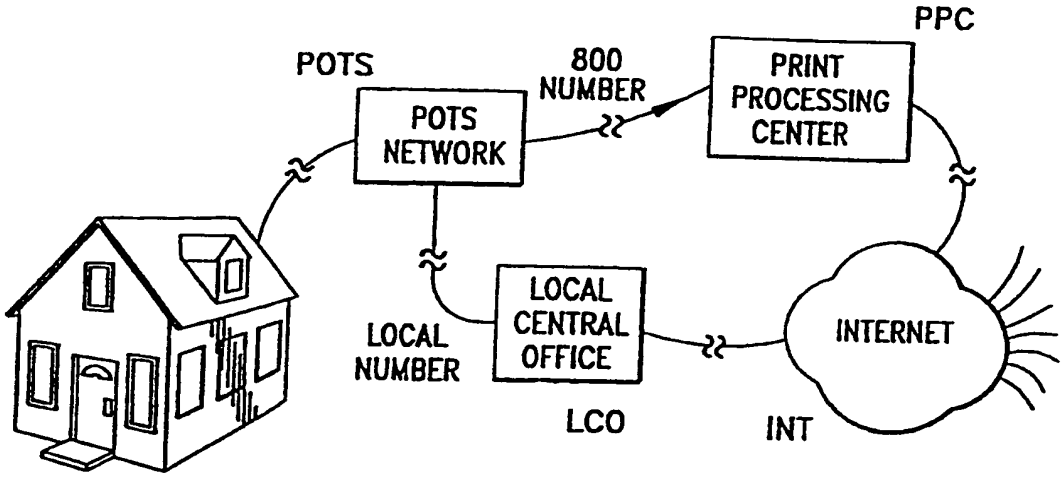

PPC
POTS
800
NUMBER
PRINT
PROCESSING
CENTER
POTS
NETWORK
LOCAL
CENTRAL
OFFICE
INTERNET
LOCAL
NUMBER
LCO
INT

FIG. 6

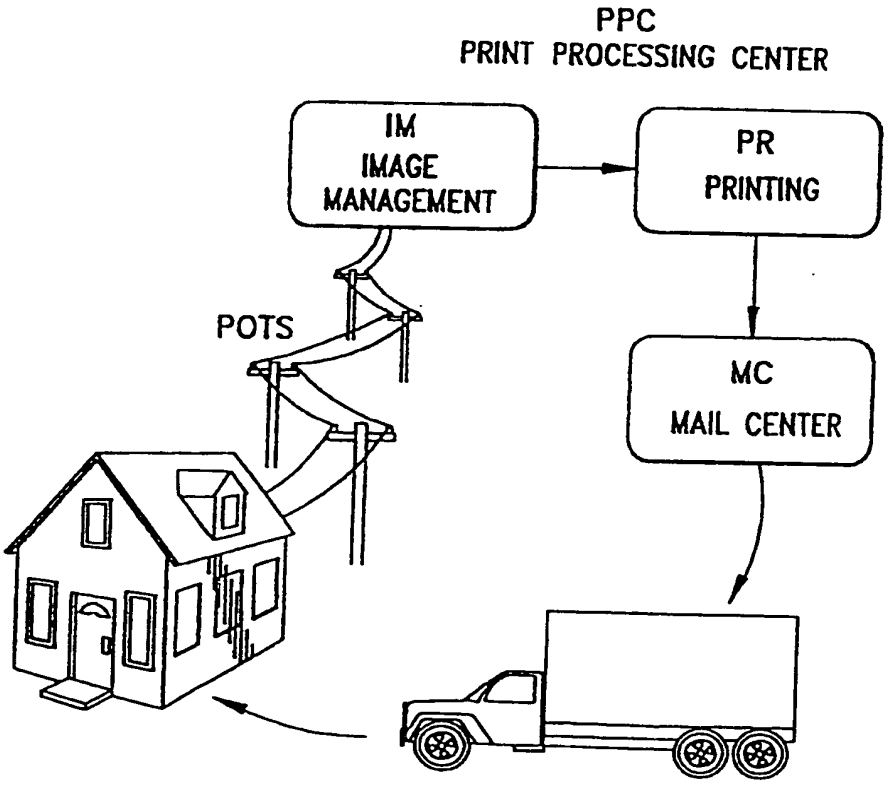

PPC
PRINT PROCESSING CENTER
IM
IMAGE
MANAGEMENT
PR
PRINTING
POTS
MC
MAIL CENTER

FIG. 7

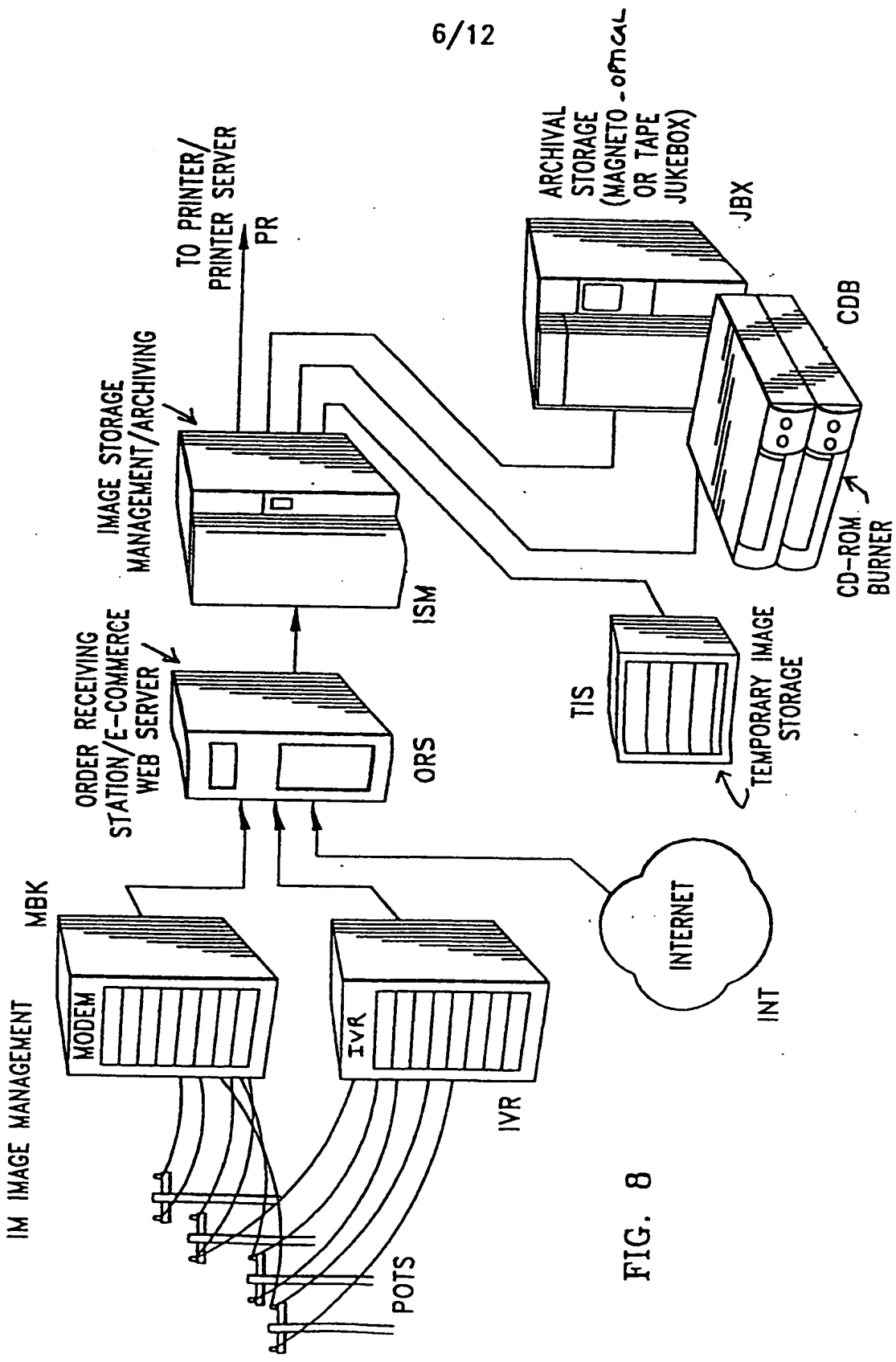

IM IMAGE MANAGEMENT
MBK
MODEM
IVR
IVR
POTS
INTERNET
INT
ORDER RECEIVING STATION/E-COMMERCE WEB SERVER
ORS
IMAGE STORAGE MANAGEMENT/ARCHIVING
ISM
TO PRINTER/ PRINTER SERVER
PR
TIS
TEMPORARY IMAGE STORAGE
ARCHIVAL STORAGE (MAGNETO-OPTICAL OR TAPE JUKEBOX)
JBX
CDB
CD-ROM BURNER

FIG. 8

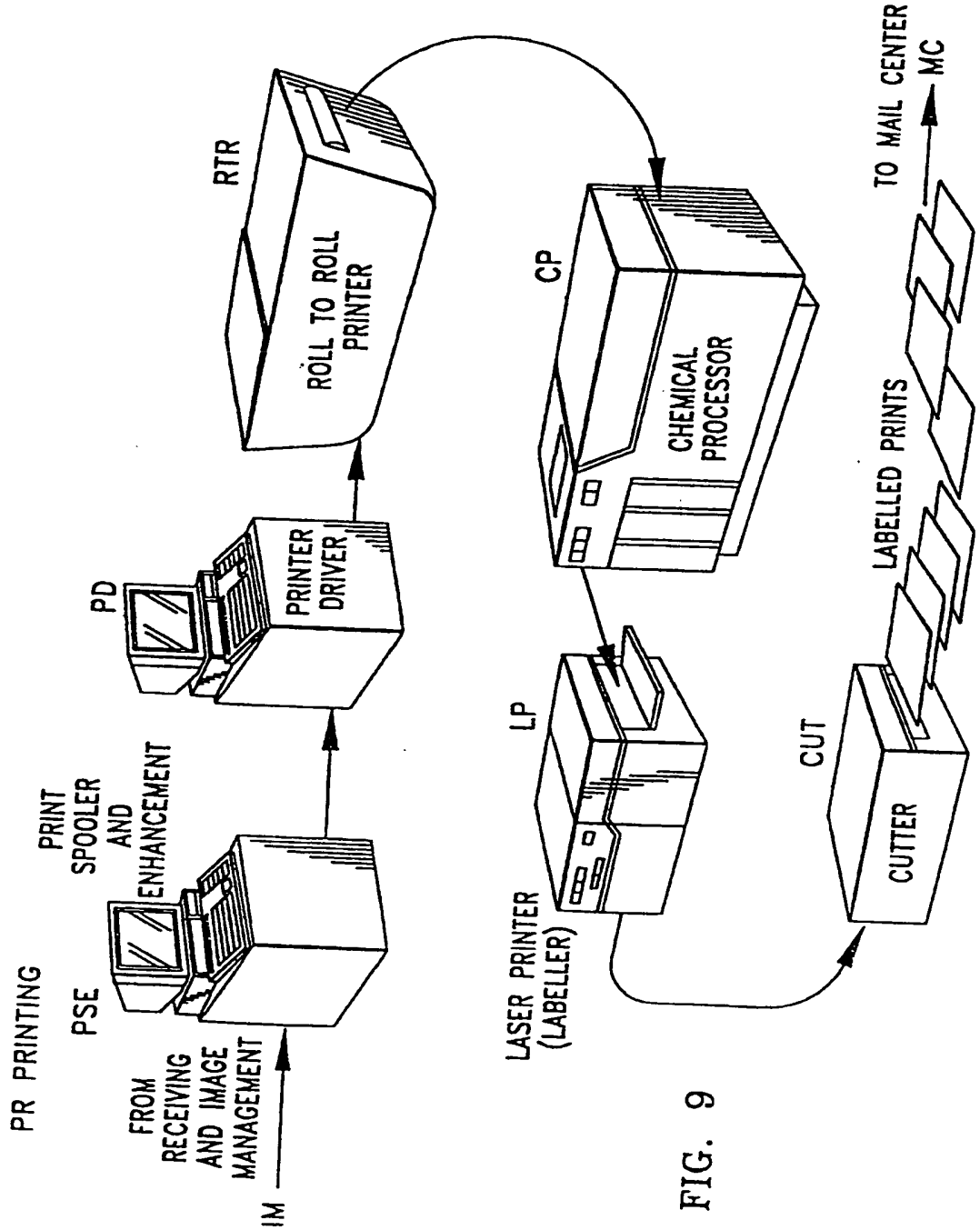

PR PRINTING
PSE
PRINT SPOOLER AND ENHANCEMENT
FROM RECEIVING AND IMAGE MANAGEMENT
IM
PD
PRINTER DRIVER
RTR
ROLL TO ROLL PRINTER
CP
CHEMICAL PROCESSOR
LP
LASER PRINTER (LABELLER)
CUT
CUTTER
LABELLED PRINTS
TO MAIL CENTER
MC

FIG. 9

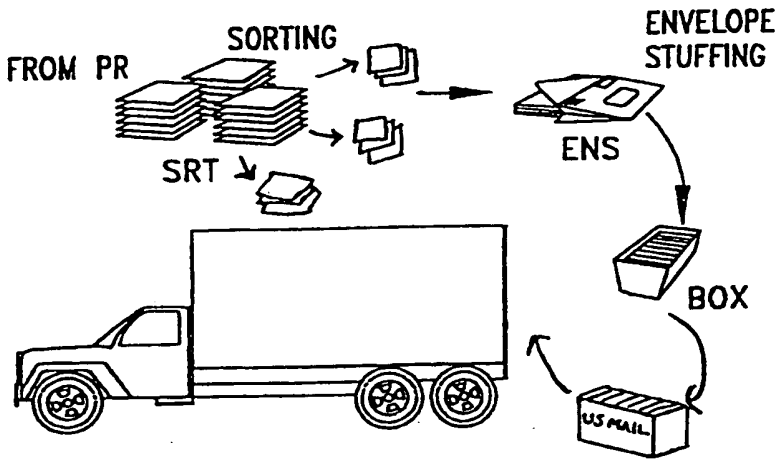

FROM PR
SORTING
SRT
ENVELOPE
STUFFING
ENS
BOX
US MAIL

FIG. 10

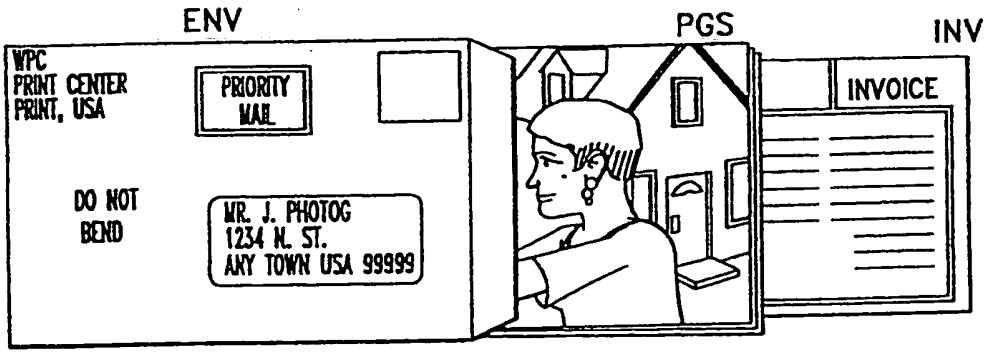

ENV
PGS
INV
WPC
PRINT CENTER
PRINT, USA
PRIORITY
MAIL
DO NOT
BEND
MR. J. PHOTOG
1234 N. ST.
ANY TOWN USA 99999
INVOICE

FIG. 11

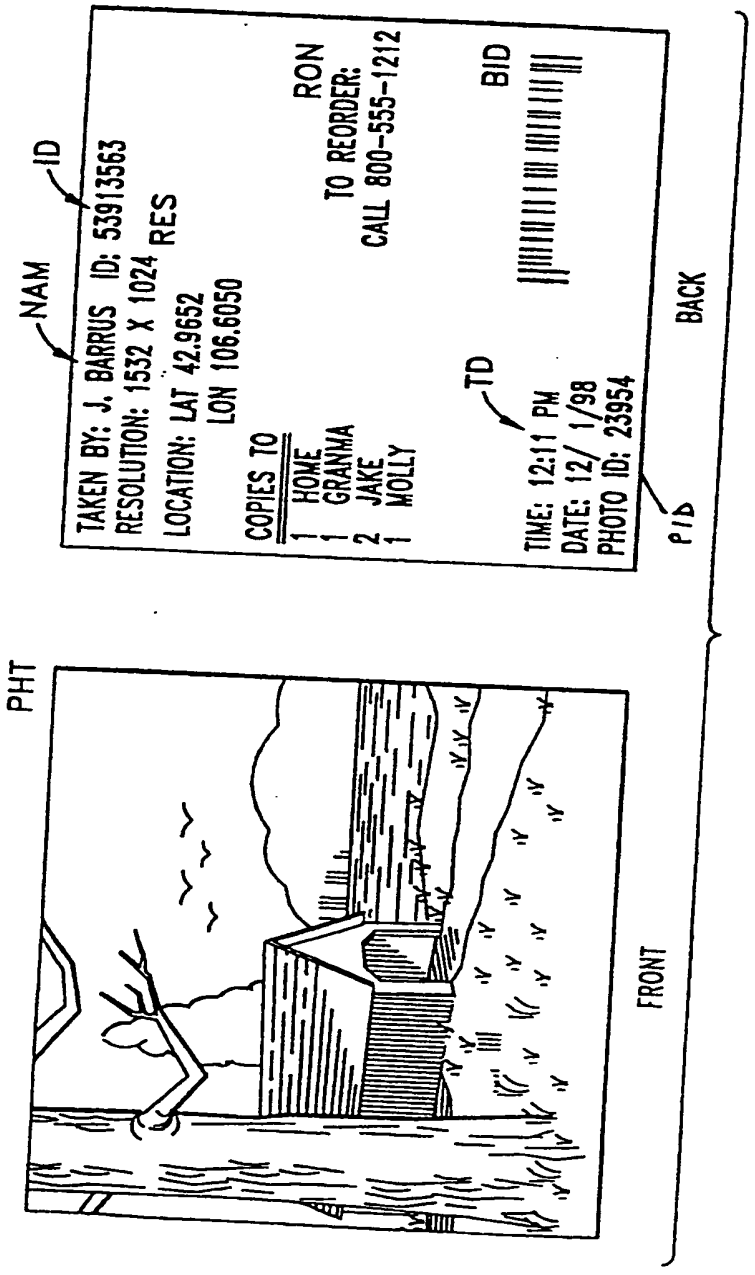

NAM
ID
TAKEN BY: J. BARRUS ID: 53913563
RESOLUTION: 1532 X 1024 RES
LOCATION: LAT 42.9652
LON 106.6050
COPIES TO
1 HOME
1 GRANMA
2 JAKE
1 MOLLY
RON
TO REORDER:
CALL 800-555-1212
BID
TD
TIME: 12:11 PM
DATE: 12/ 1/98
PHOTO ID: 23954
PID
BACK
PHT
FRONT

FIG. 12

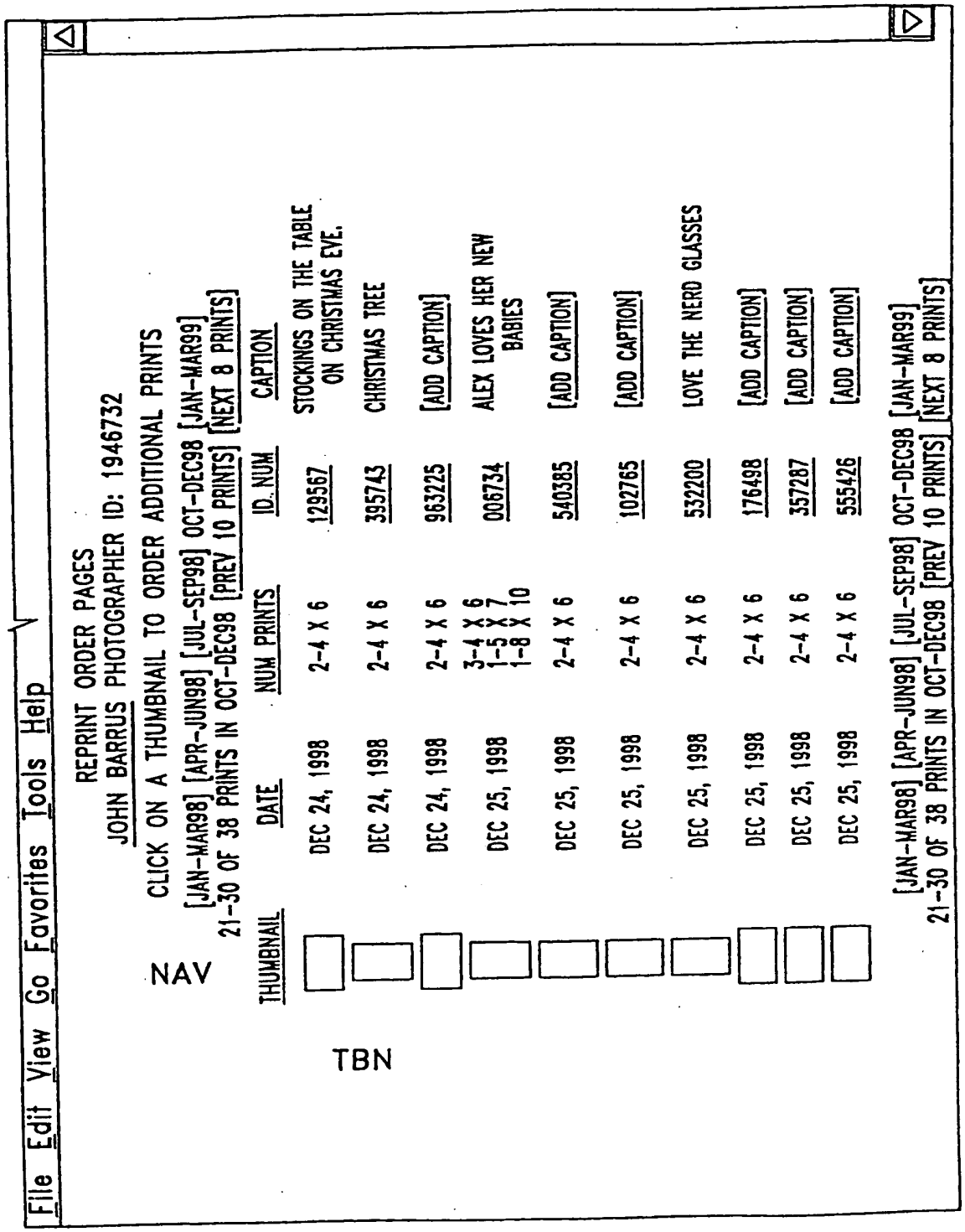

File Edit View Go Favorites Tools Help
REPRINT ORDER PAGES
JOHN BARRUS PHOTOGRAPHER ID: 1946732
CLICK ON A THUMBNAIL TO ORDER ADDITIONAL PRINTS
[JAN-MAR98] [APR-JUN98] [JUL-SEP98] OCT-DEC98 [JAN-MAR99]
21-30 OF 38 PRINTS IN OCT-DEC98 [PREV 10 PRINTS] [NEXT 8 PRINTS]
NAV
THUMBNAIL
DATE
NUM PRINTS
ID NUM
CAPTION
DEC 24, 1998
2-4 X 6
129567
STOCKINGS ON THE TABLE ON CHRISTMAS EVE.
DEC 24, 1998
2-4 X 6
395743
CHRISTMAS TREE
DEC 24, 1998
2-4 X 6
963225
[ADD CAPTION]
DEC 25, 1998
3-4 X 6
1-5 X 7
1-8 X 10
006734
ALEX LOVES HER NEW BABIES
DEC 25, 1998
2-4 X 6
540385
[ADD CAPTION]
DEC 25, 1998
2-4 X 6
102765
[ADD CAPTION]
DEC 25, 1998
2-4 X 6
532200
LOVE THE NERD GLASSES
DEC 25, 1998
2-4 X 6
176498
[ADD CAPTION]
DEC 25, 1998
2-4 X 6
357287
[ADD CAPTION]
DEC 25, 1998
2-4 X 6
555426
[ADD CAPTION]
[JAN-MAR98] [APR-JUN98] [JUL-SEP98] OCT-DEC98 [JAN-MAR99]
21-30 OF 38 PRINTS IN OCT-DEC98 [PREV 10 PRINTS] [NEXT 8 PRINTS]
TBN

FIG. 13

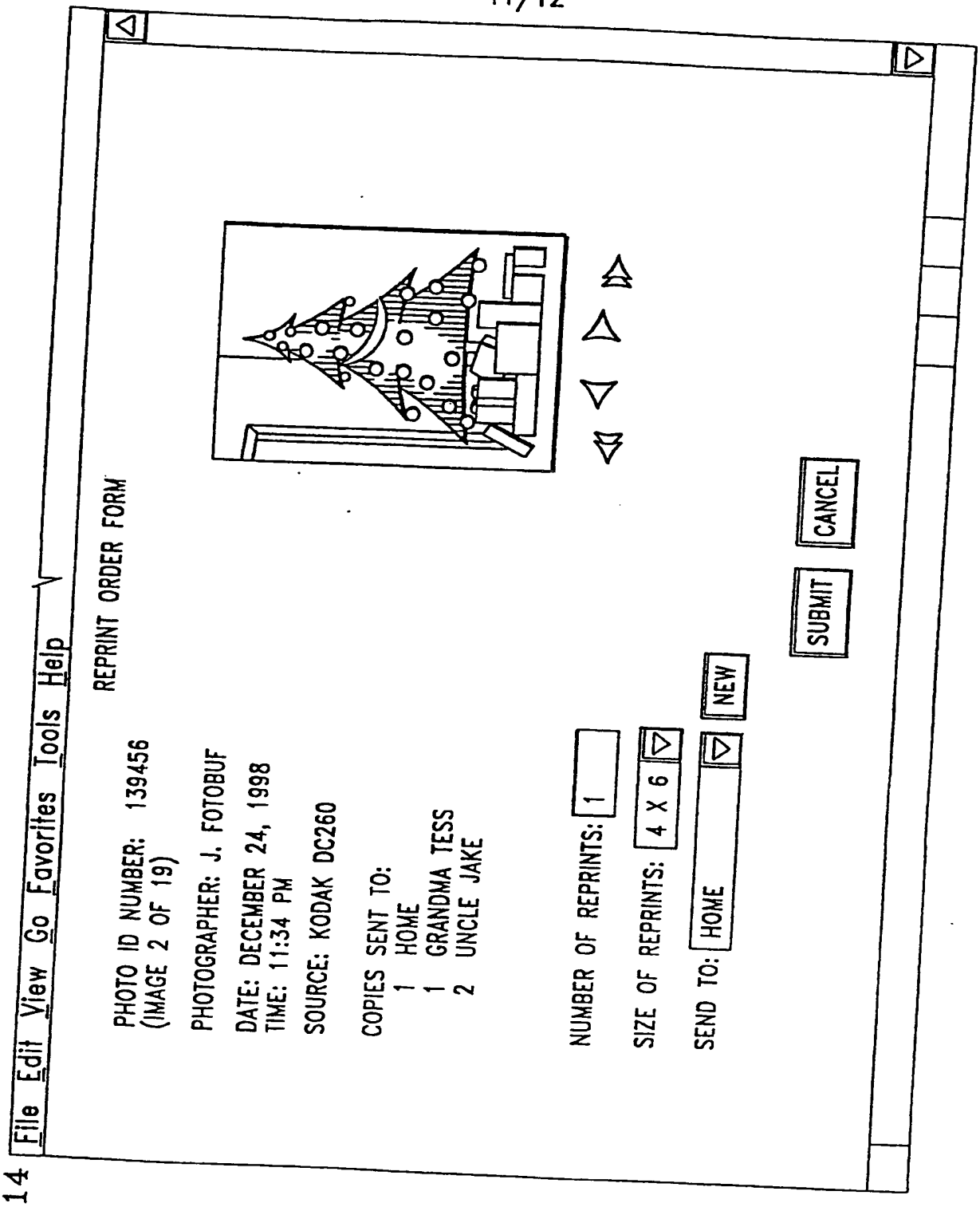

File Edit View Go Favorites Tools Help
REPRINT ORDER FORM
PHOTO ID NUMBER: 139456
(IMAGE 2 OF 19)
PHOTOGRAPHER: J. FOTOBUF
DATE: DECEMBER 24, 1998
TIME: 11:34 PM
SOURCE: KODAK DC260
COPIES SENT TO:
1 HOME
1 GRANDMA TESS
2 UNCLE JAKE
NUMBER OF REPRINTS: 1
SIZE OF REPRINTS: 4 X 6
SEND TO: HOME
NEW
SUBMIT
CANCEL

FIG. 14

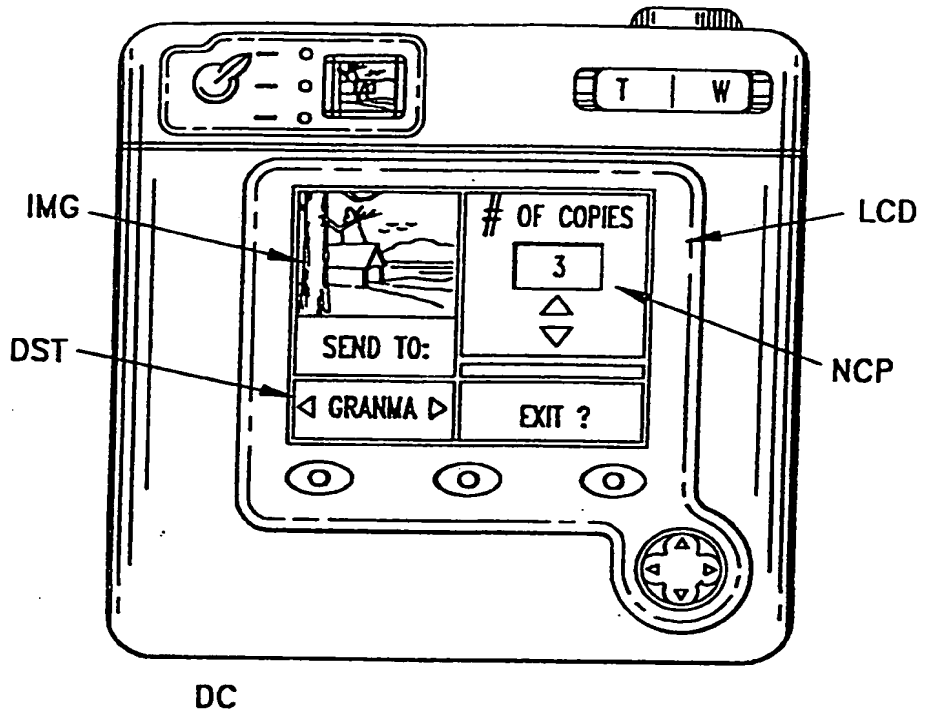


FIG. 15

FIG. 16

LAST TRANSMISSION: JAN 01 1999

P00000071.JPG	3	4X6	LOSALTOS OFFICE
P00000072.JPG	50	4X6	LOSALTOS OFFICE
P00000072.JPG	10	5X7	SAN JOSE OFFICE
P00000075.JPG	2	8X10	SAN FRAN OFFICE

END

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Docket # W50-43837
Applic. # 10/502,147
Applicant: Ishida, et al.

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